

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 August 2003 (14.08.2003)

PCT

(10) International Publication Number
WO 03/066534 A1

(51) International Patent Classification⁷: C02F 1/68, 1/76

(21) International Application Number: PCT/IT02/00067

(22) International Filing Date: 5 February 2002 (05.02.2002)

(25) Filing Language: English

(26) Publication Language: English

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

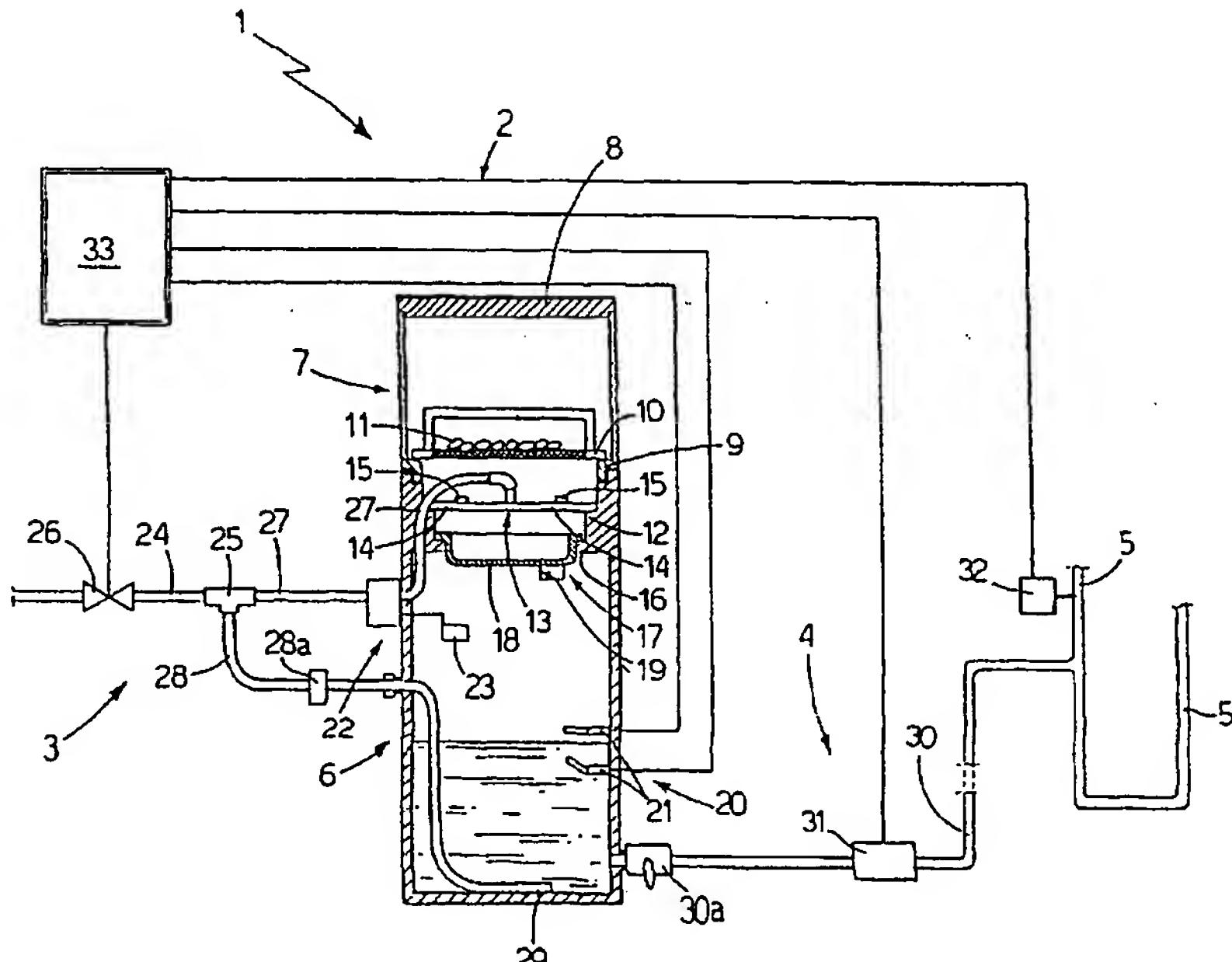
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: WATER CHLORINATING DEVICE



(57) Abstract: A water chlorinating device having a vessel (2) in turn having a bottom portion (6) for containing water; a grille (10) located over the bottom portion and for supporting a solid chemical chlorinating substance (11); a spray device (13) for directing at least one water jet on to the grille (10); and a mixing nozzle (29) located inside the bottom portion (6), at the bottom of the vessel (2), and for agitating the water in the bottom portion (6) by means of a water jet.

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WATER CHLORINATING DEVICE

Technical field

10 The present invention relates to a water chlorinating device.

The present invention may be used to advantage for treating swimming-pool water, and in particular for effectively dissolving solid chlorine derivatives (calcium hypochlorite, isocyanides, and mixtures or derivatives of these), to which the following description refers purely by way of example.

Background Art

Of known pool chlorinating devices, one comprises a vessel with a hold portion for the chlorinated water; perforated (or porous) supporting means located over the hold portion and for supporting a solid chemical chlorinating substance; and water supply means for directing at least one jet of water on to the supporting means.

The chlorinated water so produced is left inside the vessel until it is fed into the pool, so that the dissolved solid chemical substances precipitate and form

deposits inside the vessel. Since the solid chemical substances normally comprise calcium hypochlorite, the deposits mainly formed inside the vessel are calcium sulphate and calcium carbonate.

Known pool chlorinating devices therefore require regular manual removal of such deposits, after first shutting down the device and so interrupting the water treatment. While the chlorinating device is turned off to clean the vessel, pool hygiene is therefore impaired; and the need for relatively frequent manual cleaning of the vessel results in relatively high maintenance costs.

Summary of the Invention

It is an object of the present invention to provide a water chlorinating device designed to eliminate the aforementioned drawbacks, and which is also cheap and easy to produce.

According to the present invention, there is provided a water chlorinating device as claimed in Claim 1.

In a preferred embodiment, the mixing means comprise spraying means for emitting at least a second jet of water.

Brief Description of the Drawings

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic front section of a water chlorinating device in accordance with the present

invention and connected to a swimming-pool recirculating line;

Figure 2 shows a larger-scale plan view of a detail of the Figure 1 device.

5 Detailed Description of Embodiments of the Invention

Number 1 in Figure 1 indicates as a whole a swimming-pool water chlorinating device comprising a substantially cylindrical vessel 2 in which the water is chlorinated; a supply unit 3 for feeding water from a 10 known water system (not shown) into vessel 2; and a discharge unit 4 for feeding chlorinated water from vessel 2 into a swimming-pool, a portion of a recirculating circuit 5 of which is shown in Figure 1.

Vessel 2 is positioned vertically, and is defined at 15 the bottom by a chlorinated water hold portion 6, which is located beneath a containment portion 7 hinged to and defined at the top by a cover 8. Portions 6 and 7 can be separated for relatively easy maintenance inside portion 6.

20 Vessel 2 has an annular supporting member 9 located at the bottom end of portion 7 and on which rests a removable grille 10 for supporting a solid chemical chlorinating substance 11, preferably in the form of pellets and containing calcium hypochlorite, isocyanides, 25 and mixtures or derivatives of these.

Vessel 2 also comprises an annular supporting member 12 located at the top end of hold portion 6 and supporting a water dispersion unit 13 underneath grille

10. Dispersion unit 13 is removable, provides for dissolving solid chemical substance 11 by directing three vertical water jets on to grille 10, and comprises three linear, horizontal conduits 14 connected spoke-fashion at 5. the centre. Each conduit 14 has a closed outer end, and is fitted with a spray nozzle 15 for directing a water jet on to grille 10.

Vessel 2 also comprises an annular supporting member 16 for supporting a substantially cylindrical member 17 10 coaxial with vessel 2 and located beneath dispersion unit 13. Cylindrical member 17 is open at the top, and is defined at the bottom by a circular, substantially horizontal wall 18 with two holes 19, through which the chlorinated water flows in use.

15 Device 1 also comprises a level detecting unit 20 for detecting the chlorinated water level inside hold portion 6, and which comprises two substantially identical known floats 21 (shown schematically) spaced apart, one over the other, inside hold portion 6 and 20 beneath cylindrical member 17. Each float 21 is movable between a respective lowered position and a respective raised position, and has a known sensor (not shown) for detecting its position. In actual use, each float 21 is in the raised position when reached or exceeded by the 25 chlorinated water level.

Device 1 also comprises a safety unit 22 (known and shown schematically) for cutting off water supply to dispersion unit 13 when, in use, the chlorinated water

level in portion 6 exceeds both floats 21 and reaches a given safety level. Safety unit 22 comprises a float 23 located inside hold portion 6, above floats 21 and beneath cylindrical member 17, and the position of which 5 defines the safety level.

Supply unit 3 comprises a pipe 24 for feeding water from the known water mains (not shown) to a T fitting 25; and a solenoid valve 26 installed, and for regulating water flow, along pipe 24.

10 Supply unit 3 also comprises a conduit 27 for feeding water from fitting 25 through known safety unit 22 (shown schematically) to water dispersion unit 13; and a conduit 28 for feeding water directly from fitting 25 to hold portion 6. Conduit 28 has a first end connected 15 to fitting 25; and a second end 29 resting on the bottom of vessel 2, so that, in use, the water jet from second end 29 mixes the chlorinated water inside portion 6.

Supply unit 3 also comprises a hand-operated tap 28a installed, and for regulating water flow, along conduit 20 28.

Discharge unit 4 comprises a pipe 30 connecting hold portion 6 to recirculating circuit 5; and a pump 31 located along pipe 30 and for feeding the water from vessel 2 along pipe 30 to recirculating circuit 5. Pipe 25 30 is connected to vessel 2 by a ball valve 30a.

Device 1 also comprises a concentration sensor 32 for determining the chlorine concentration of the chlorinated water in recirculating circuit 5 upstream

from pipe 30.

Finally, device 1 also comprises a control unit 33 connected electrically to solenoid valve 26, to pump 31, to the known sensors (not shown) of floats 21, and to 5 sensor 32.

Control unit 33 activates pump 31 on the basis of the findings of sensor 32 to keep the chlorine concentration of the pool water, i.e. of the water in recirculating circuit 5, between a minimum and a maximum 10 concentration. More specifically, in actual use, unit 33 activates pump 31 when the chlorine concentration detected by the sensor is relatively close to the minimum concentration, and stops pump 31 when the chlorine concentration detected by sensor 32 is relatively close 15 to the maximum concentration.

Control unit 33 also controls solenoid valve 26 to keep the chlorinated water in hold portion 6 between a minimum and maximum level. More specifically, in actual use, unit 33 opens solenoid valve 26 when both floats 21 20 are in the lowered position, and closes solenoid valve 26 when both floats are in the raised position.

In actual use, the water jet from end 29 of conduit 28 agitates the chlorinated water in hold portion 6, so that salt precipitation - mainly calcium carbonate and 25 calcium sulphate (if calcium hypochlorite or similar is used) - and hence the formation of deposits inside portion 6 are fairly unlikely. In an embodiment not shown, conduit 28 is replaced with a known mechanical

agitator (e.g. a rotary blade) to keep the chlorinated water in hold portion 6 in motion.

In a further embodiment not shown, conduit 28 is replaced with a recirculating unit for drawing and 5 feeding back chlorinated water from and to portion 6, and which comprises a U-shaped conduit, along which water is fed by a pump. In actual use, the water jet from one end of the conduit agitates the chlorinated water in hold portion 6.

10 In a further embodiment not shown, safety unit 22 is connected electrically (in known manner) to control unit 33, so that control unit 33 closes solenoid valve 26 when the chlorinated water in portion 6 reaches the safety level.

CLAIMS

1) A water chlorinating device comprising a vessel
(2) having a hold portion (6) for chlorinated water,
5 supporting means (10) located over the hold portion (6)
and for supporting a solid chemical chlorinating
substance (11), and water dispersion means (13) for
directing at least a first water jet on to the supporting
means (10); the device (1) being characterized by
10 comprising mixing means (28, 29) located at the hold
portion (6) and for agitating the chlorinated water.

2) A device as claimed in Claim 1, wherein said
mixing means (28, 29) comprise spraying means (28, 29)
for emitting at least a second water jet.

15 3) A device as claimed in Claim 1 or 2, wherein the
water dispersion means (13) are located over the hold
portion (6) and beneath the supporting means (10).

4) A device as claimed in one of the foregoing
Claims, wherein said supporting means (10) comprise a
20 grille (10).

5) A device as claimed in one of the foregoing
Claims, and comprising supply means (3) for feeding water
into the vessel (2); discharge means (4) for drawing
chlorinated water from the vessel; level detecting means
25 (20) for detecting the level of the chlorinated water in
the hold portion (6); and a control unit (33) for
controlling the supply means (3) and connected to the
level detecting means (20) to keep the level of the

chlorinated water in the vessel (2) substantially between a maximum level and a minimum level.

6) A device as claimed in one of the foregoing Claims, and comprising supply means (3) for feeding water into the vessel (2); discharge means (4) for feeding chlorinated water from the vessel (2) to an external container, in particular a swimming-pool; concentration detecting means (32) for detecting the chlorine concentration of the chlorinated water in the container; and a control unit (33) for activating the discharge means (4) and connected to the concentration detecting means (32) to keep the chlorine concentration of the chlorinated water in the container between a maximum concentration and a minimum concentration.

15 7) A device as claimed in Claim 5 or 6, and comprising a safety unit (22) connected to said control unit (33) and for detecting a safety level of the chlorinated water in said hold portion (6); the safety level being above said maximum level; and said control unit (33) disabling said supply means (3) upon said safety unit (22) detecting said safety level.

8) A device as claimed in one of the foregoing Claims, wherein said mixing means (28, 29) comprise at least one mechanical agitator.

25 9) A device as claimed in one of the foregoing Claims, wherein the mixing means (28, 29) comprise at least one recirculating unit for drawing water from the vessel (2) and feeding it back into the vessel (2).

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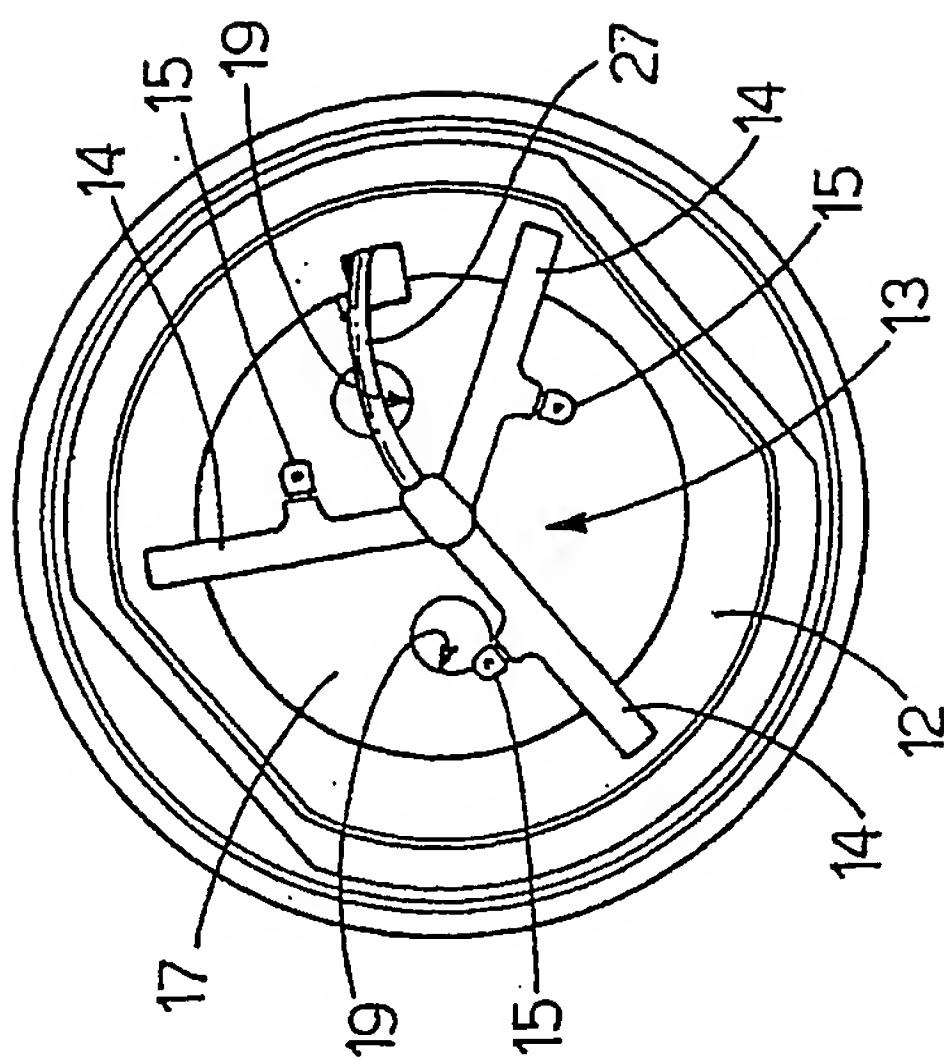


Fig. 2

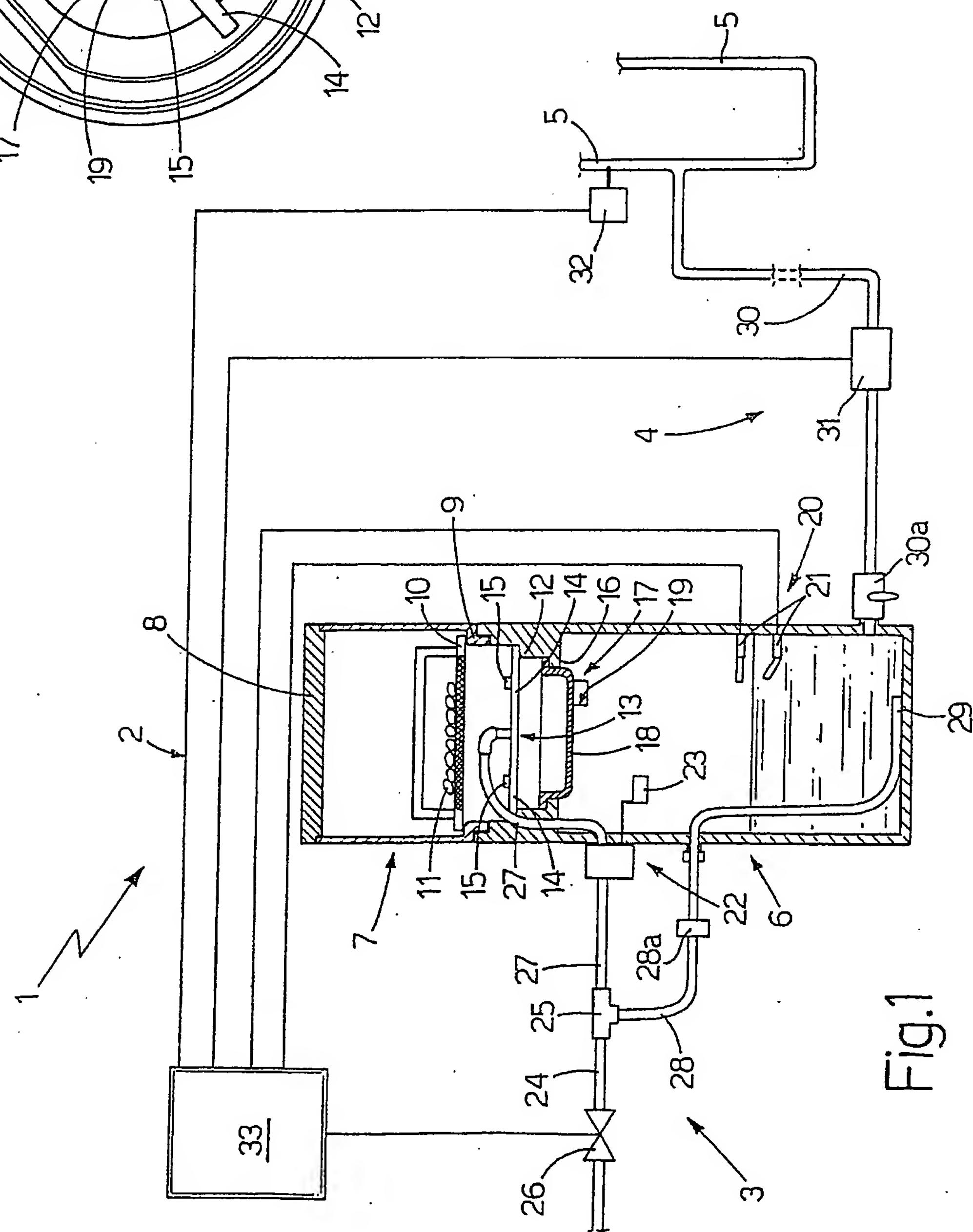


Fig. 1

INTERNATIONAL SEARCH REPORT

Intel

International Application No

PCT/IT 02/00067

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C02F1/68 C02F1/76

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 928 608 A (LEVESQUE KENNETH JOHN ET AL) 27 July 1999 (1999-07-27) the whole document ---	1-6,8
X	US 4 260 587 A (BRADEN JOHN R) 7 April 1981 (1981-04-07) claims; figures ---	1
A	US 5 089 127 A (JUNKER DAVID M ET AL) 18 February 1992 (1992-02-18) claims; figures ---	1
A	US 4 297 223 A (RIVENBARK MORRISON) 27 October 1981 (1981-10-27) the whole document ---	1

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

Date of mailing of the International search report

22 October 2002

31/10/2002

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INTERNATIONAL SEARCH REPORT
Information on patent family members

Inten

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PCT/IT 02/00067

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